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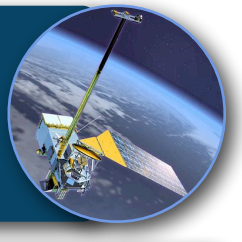
NOAA's Capital Assets



Public Demand

The evolving needs of the Nation demand the continuity of services provided by NOAA's critical infrastructure. The condition, readiness, and vulnerabilities of this infrastructure have consequences on human welfare, economic well being, and our ability to understand and manage Earth's environment. Industries such as utilities, agriculture, oil and gas, health care, insurance, building and construction, and real estate face a growing list of challenges from climate change, high impact weather events, water availability and management, increases on transportation systems, coastal community expansion, and sustainable ocean and marine life.

Unique to NOAA's mission are the environmental data collected from satellites, ships, aircraft, buoys, and other observing systems. These systems, along with high performance computing and associated facilities, are the capital assets that form the foundation of NOAA's success. It is the continuity and improvement of key infrastructure that will enable the agency to fulfill its future responsibilities to the nation.

As the national demand for NOAA products and services increases, the agency's demand for key infrastructure increases as well. For example, as NOAA addresses the evolving societal demands for accurate, timely, and reliable climate information, the agency will need a denser network of climate reference observations, robust models and analytical tools, and dynamic information delivery systems. Also, as the nation's dependence on intermodal transportation systems grows, transportation managers will demand quicker response and more timely environmental information from NOAA.

NOAA's Role

NOAA's core services include severe weather warnings and guidance, coastal charting, climate change assessments, and ecosystem monitoring and management (including that of fisheries stocks, endangered species, habitat protection and restoration, and hazard mitigation).

Legislation and Executive Orders provide the authority for these roles, but performance of these responsibilities requires significant investment in infrastructure. These assets include NOAA's facilities, remote and in-situ observing systems and platforms, and high performance computing and information technology systems.

NOAA must fund, maintain, and operate its infrastructure assets to perform the required core tasks. These capital assets determine NOAA's ability to meet its core mission requirements; particular assets often support many of NOAA's mission areas at once. Thus, the availability and condition of NOAA's unique infrastructure has consequences on human welfare, economic well being, and the advancement of the understanding of our environment.

Current Capabilities

NOAA collects images and precise measurements of the land, sea, and air through a constellation of environmental satellites. These satellites are NOAA's only continuous, global source of Earth and near-space environment measurements and provide more than 95% of the data used in operational numerical modeling.

NOAA's survey and research ships conduct charting operations and ecosystems observations that support fish habitat monitoring and conservation and provide a means to monitor, assess, and create forecasts for living marine and coastal resources and their environment.

NOAA's aircraft enable vital data collection on protected species populations and migrations, which exist in remote or hard to access areas that can only be surveyed by air. NOAA aircraft spend about 29% of their annual flight hours supporting hurricane and winter storm forecasting and atmospheric research, and 18% performing shoreline mapping in support of commerce and transportation.

NOAA's ocean observing system inventory includes 16 systems, 3,449 platforms encompassing underwater hydrophones, buoys, floats, and drifting and moored stations delivering 2.5 million quality real-time observations to the user community each year.

NOAA currently maintains a suite of environmental models producing thousands of informational products daily for routine public use as well as for special needs, such as emergency management. Each model fills a niche in NOAA's mission and has unique data input, computational resource, runtime availability, and product delivery time requirements.

NOAA's inventory of 788 buildings includes owned and leased facilities dispersed across the U.S. and Pacific.

Gap and Solution

There are both observational continuity and service capability gaps in the current satellite programs. To address these gaps, NOAA plans to continue the current POES, GOES, NPOESS, GOES-R and altimeter programs; ensure follow-on of the polar-orbiting and geostationary satellite programs; continue transition of successful NASA research satellite missions into NOAA operations; and pursue alternatives to address additional critical missions such as Climate and Solar Wind instruments.

NOAA's fleet of ships and small boats faces the challenge of expanding mission requirements, age and obsolescence, and finite resources for recapitalization. NOAA's duties to chart, manage, and explore ocean resources demands the replacement of nine of the 19 aging ships with service life expectancies ending between 2010-2024. In 2008, the Department of Commerce approved the NOAA FY 2010-FY 2024 Ship Recapitalization Plan, which recommends the purchase of nine new ships. NOAA is developing an FY 2011-2025 NOAA Aircraft Recapitalization Plan to further assess current NOAA airborne data collection capabilities and ensure the sustainability of vital airborne data collection. NOAA is also investigating the possible uses of independently or remotely piloted Unmanned Aircraft Systems (UAS) for obtaining research data.

The need for buoy data used in climate and weather forecasts is greater than current capability (which is about 60% of the initial system design). Integrating buoy networks and regional observing systems helps to solve some of the data gap issues. A Buoy Recapitalization Plan is under development to assess requirements and capabilities to inform buoy investment strategies.

Improvements in data acquisition, processing, modeling, and delivery methods will enable NOAA to provide more accurate and timely forecasts, assessments, and warnings. For example, increasing hurricane model resolution to 1km requires 5,500 times more computational power than currently available. The increasing complexity of climate system modeling will also require the use of high resolution coupled models using nearly 800 times the current computing capability.

Complementary computing infrastructure will also be needed for software engineering, data processing and analysis, graphics, archiving, accessing, and networking.

Useful integration of the growing volume of environmental data and information products requires standards such as the Global Earth Observation-Integrated Data Environment (GEO-IDE) and Integrated Ocean Observing System (IOOS) Data Management and Communications (DMAC) structure. NOAA is continually improving methods and technologies to manage and deliver information in a more efficient and effective manner. The NOAA High Performance Computing Plan has been developed to provide the roadmap for making these critical improvements. NOAA will also focus on three strategic facility objectives, reflected in the 2008 NOAA Facility Modernization Plan. These objectives are maintaining current facility assets at safe and operational levels, modernizing NOAA's current aging and at-risk facility assets, and promoting collocation.

Impacts and Benefits

Investing effectively in key infrastructure enables NOAA to conduct its mission by improving weather warnings and forecasts, enhancing climate monitoring and research, advancing the understanding and management of oceans, coasts and their watersheds, and charting for safer, more expedient transportation.

Credible and timely climate observations will allow decision-makers the benefit of precise information which may avoid costly reactive measures. Improved ocean surface wind measurements should allow commercial shipping to bypass otherwise undetectable storms—avoiding lost cargo or vessels. To tie the processes together, the effective use of modeling provides environmental forecasts to protect life and property, fostering a safe and efficient transportation system, and supporting the economic well-being of the nation.

Filling the gaps in NOAA's buoy network will increase temporal, spatial, and diversity of measurement parameters and sensing in the Arctic region, which is growing more accessible due to sea ice retreat. Integrated buoy data can improve model accuracy, impacting hurricane models, harmful algal bloom forecasts, integrated ecosystem assessments, and coastal inundation models. Increasing the capabilities and capacities of high performance computing supports initiatives such as the development of a national suite of climate services and improvements in high impact weather forecasting and tracking.